

REMARKS/ARGUMENTS

Claim 69 has been amended to depend from independent Claim 53 rather than from Claim 55. The claims before the Examiner remain Claims 37, 39-53, and 55-69.

The objection to the specification under 35 U.S.C. § 132 and the related rejection of Claims 37, 39-53, and 55-66 under the first paragraph of 35 U.S.C. § 112 as allegedly failing to comply with the written description requirement is respectfully traversed. The Examiner states that the working examples do not support the term "separating" as those examples include a washing step, a treatment deemed less broad than "separating". Applicants respectfully submit that the specification as a whole supports the term "separating" because the discussion in the paragraph bridging pages 15 and 16 discusses three different methods of contact of the amine compound with the solid polymer electrolyte. Those methods include direct contact with an amine compound, contact with an amine compound dissolved in an appropriate solvent (as shown in the working examples), and a method of exposing a solid polymer electrolyte or precursor thereof to an amine compound vapor. Separation is required for each of these treatments and it is respectfully submitted that the broader term is proper and need not be restricted to the particular embodiments shown in the working example. Should one be carrying out the aspect of the invention involving contact of the solid polymer electrolyte with an amine compound in the vapor state, separation of the amine-contacted solid polymer electrolyte or its precursor from the amine compound would not be carried out by washing. The specification permits use of the broader term. If, after considering this explanation, the Examiner believes other language is more appropriate, she is asked to contact the undersigned.

The rejection of Claims 37, 39, 41, 42, and 67 under 35 U.S.C. § 102 as anticipated by Michot et al. '424 is respectfully traversed. The present invention as explained in the specification and in previous replies, relates to a two- or three-phase treatment process in

which treatment with an amine will introduce a sulfone imide and, after separation of the amine crosslinks, will form by conversion to sulfone imide by heat treatment, a base treatment, or a combination of a heat treatment and a base treatment.

The advantages of the present invention are discussed at pages 8, 17, 22, and 23 of the specification. More particularly, it is explained at page 8, lines 9-13 that the process gives a modified electrolyte having excellent durability, heat resistance, and high temperature creep resistance while electric conductivity remains high. At page 17, second full paragraph, it is stated that conducting the amine treatment, base treatment, and heat treatment, in that order, give an improvement in heat resistance and creep resistance with almost no decrease in electric conductivity. The paragraph bridging pages 22 and 23 informs the reader that providing base treatment after the amine treatment allows the base treatment to promote a crosslinking reaction to form crosslinking efficiently. The same observation applies to the heat treatment being carried out after the amine treatment. The first full paragraph on page 23 explains that carrying out the heat treatment, base treatment, and heat treatment, in that order, gives a synergetic effect to yield significant improvements in heat resistance and high temperature creep resistance with even greater efficiency while maintaining a high electric conductivity. The separation of the amine-contacted solid polymer electrolyte or precursor from the amine compound before further treatment with heat, a base, or both can prevent lowering of the electric conductivity.

The Examiner asserts that Michot et al. '424 in Example 11 teaches a process for obtaining an electrolyte polymer by treating an electrolyte polymer with ammonia. Applicants respectfully disagree. Example 11 of the reference is directed to a further treatment of a membrane that is made according to Example 3 of the reference; in that latter example, heat treatment is carried out directly after amine treatment. There is no separation. As such, the product is already formed and is not that of the present invention. Example 3

includes covering the polymer “with a solution of 600 mg of the sulfamide disodic derivative in 50 ml in diglyme. The mixture is heated to 125°C. for 4 hours under argon.” Heating unquestionably takes place without separation. Reference to Example 11 of the patent which undertakes a further treatment of the product made in accordance with Example 3 thereof does not and can not teach the invention claimed herein. Applicants point out also that Example 11 calls for the further addition of hexafluoropropane-1,3-disulfonic acid fluoride after treatment with ammonia; heating is conducted in the presence of the former compound. With such a technique, it is difficult to perform crosslinking, which is the objective of the present invention and the reason why the process is controlled as recited in the claims. One can safely say, however, that conducting heating in the presence of the added compound will result in a reaction different from a reaction that would occur when heating in the absence of the added compound. As such, the process of Claims 37, 39, 41, 42, and 67 are not taught by Example 11 of Michot et al. ‘424. The rejection should be withdrawn.

The rejection of Claims 37 and 40 under 35 U.S.C. § 102 as anticipated by or alternatively under 35 U.S.C. § 103 as obvious over Michot et al. ‘424 is also respectfully traversed. The process of independent Claim 37 specifically calls for separation of the amine-contacted solid polymer prior to heating. No such technique is shown in the reference as explained in the paragraph just above. Indeed Examples 3-5 of Michot et al. ‘424 disclose a mixture of membrane, amine compound, solvent, and other additives is heated. (Examples 4 and 5 follow the techniques shown in Example 3.) Such a treatment causes problems due to an increase in the amount of residual sulfone amide when high crosslinks are to be achieved. Applicants set out to, and did, find a process that facilitates crosslinking. The treatments in Michot et al. ‘424 fail to do so. The claims patentably define over the teachings in this reference, and the rejection also should be withdrawn.

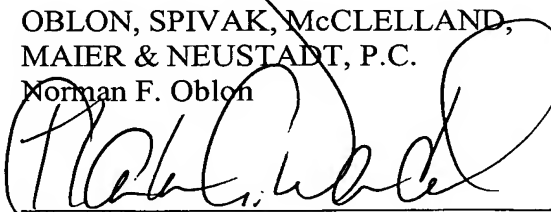
The rejection of Claims 43-53, 55-56, 68, and 69 under 35 U.S.C. § 103 as unpatentable over Michot et al. '424 is respectfully traversed. As explained previously in this paper, there are no examples in Michot et al. '424 (nor is there any disclosure) regarding separation of the amine-treated solid polymer electrolyte prior to heat, base, or a combined treatment. The rejection should be withdrawn.

The comments in the Response to Arguments section of the Office Action have been noted. Applicants have explained previously and here why the reference does not teach a step of heating following separation of the amine-contacted solid polymer electrolyte or precursor from the amine compound. The claims are patentable.

In view of the foregoing revisions and remarks, it is respectfully submitted that the application is in immediate condition for allowance and a USPTO paper to those ends is earnestly solicited. The Examiner is requested to telephone the undersigned if additional changes are required in the case prior to allowance.

Respectfully submitted,

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